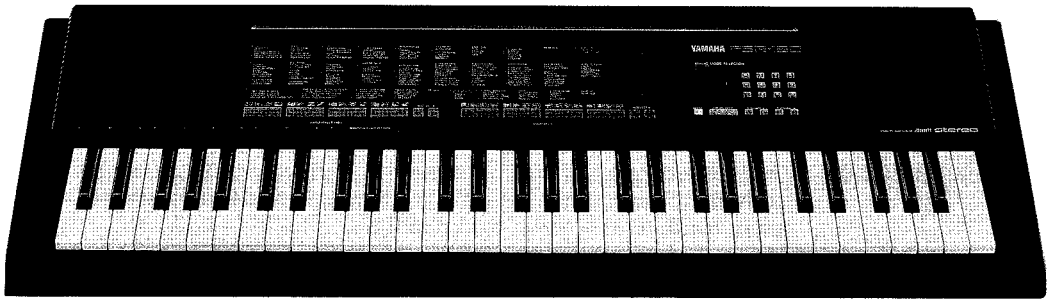
PORTATONE

PSR-150

SERVICE MANUAL



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PARTS LIST

PSR-150

SK 001468

YAMAHA CORP.
HAMAMATSU. JAPAN
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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!.

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

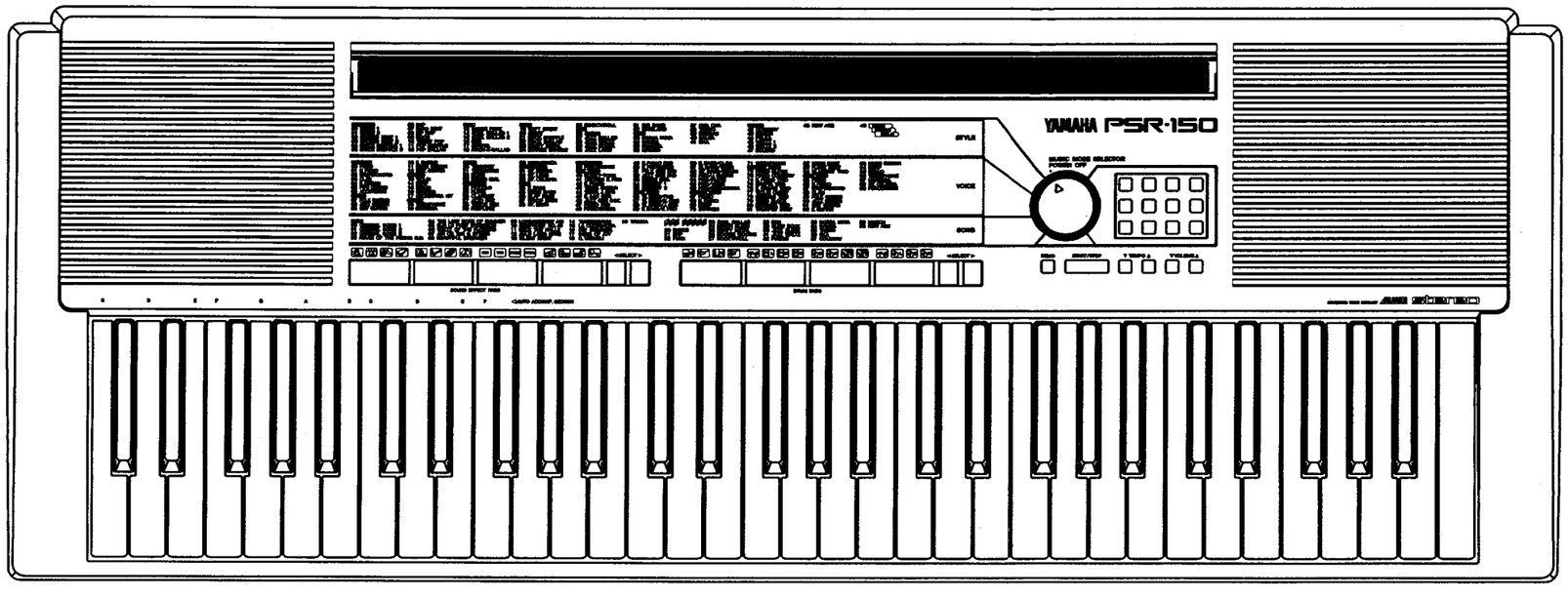
PSR-150

■ SPECIFICATIONS

KEYBOARD	Number of Keys	61
	Key Size	Regular
	Register	C1 ~ C6
VOICE	Tone Generation	AWM
	Number of Voices	100
	Polyphony (Maimimum)	12
STYLE	Number of Styles	50
	Auto Accompaniment	○
	Chord Detection	Multi
	Bass Chord Hold	○
SONG (DEMONSTRATION)	Number of Songs	20
	Songs for Music Minus-one	20
	Jam Tracks	20
PERCUSSION	Drum Pads	4 × 4
	Sound Effect Pads	4 × 4
CONTROL		MUSIC MODE SELECTOR (POWER OFF/STYLE /VOICE/SONG), Numeric Keypad (0 ~ 9), ± Buttons, START/STOP, TEMPO ▲,▼, VOLUME ▲,▼, DEMO, PADS SELECT
OTHER FITTINGS		DC IN, HEADPHONES /AUX. OUT, Music Stand
OPTIONAL ACCESSORIES		HPE-3/5 Headphones, PA-3/PA-4/PA-40 (US only) Power Adaptors, L-2C Keyboard Stand
SOUND SYSTEM		Stereo
	Amplifiers	2.1W × 2
	Speakers	10cm × 2
RATED POWER SUPPLY		DC 9-12V: D/R-20/SUM-1 (1.5V) × 6, PA-3/4/40 Power Adaptors
BATTERY LIFE		4 hours (when playing the Demo Songs)
POWER CONSUMPTION		During AC power adaptor: 7W During battery use: 4W
DIMENSIONS (W × D × H)		930 × 341 × 118mm (36-5/8'' × 13-3/8'' × 4-5/8'')
WEIGHT		4.30kg (9 lbs., 8 oz.)
CASING		Polystyrene

■ PANEL LAYOUT

- Top Panel



- Rear Panel

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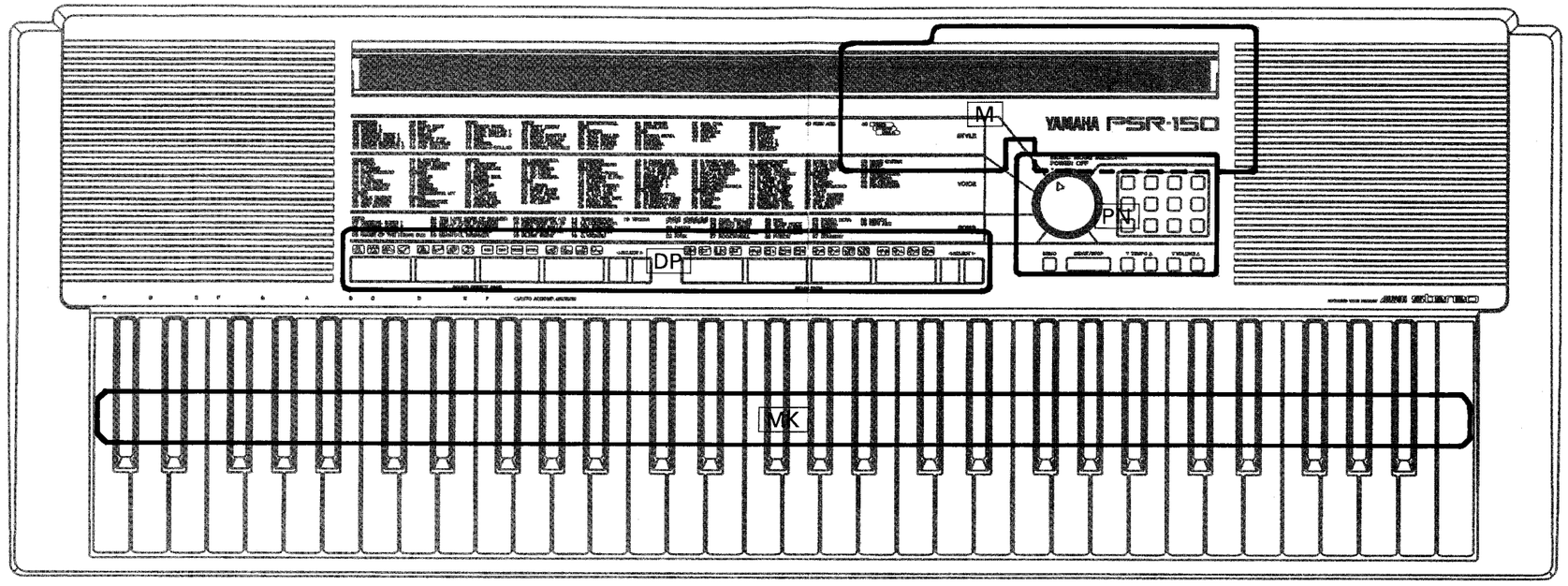
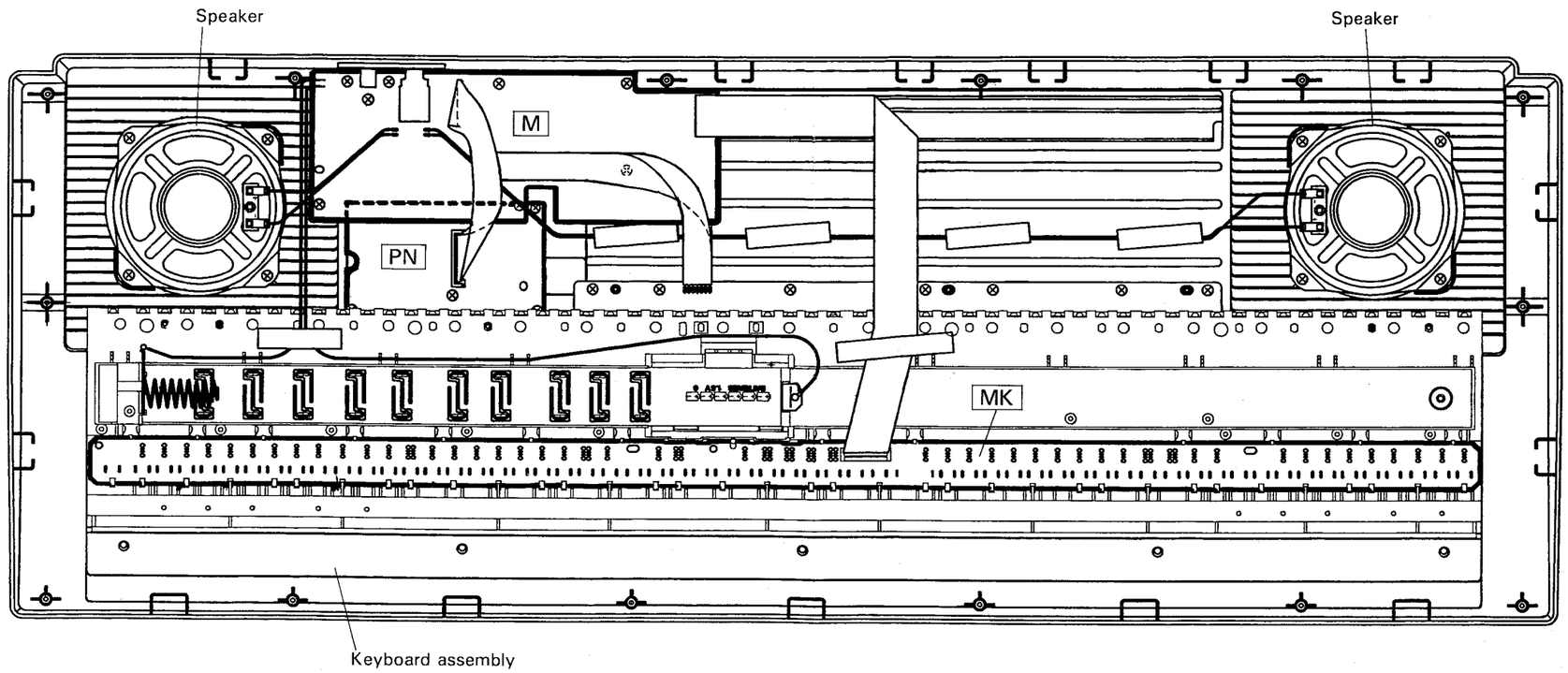
■ CIRCUIT BOARD LAYOUT





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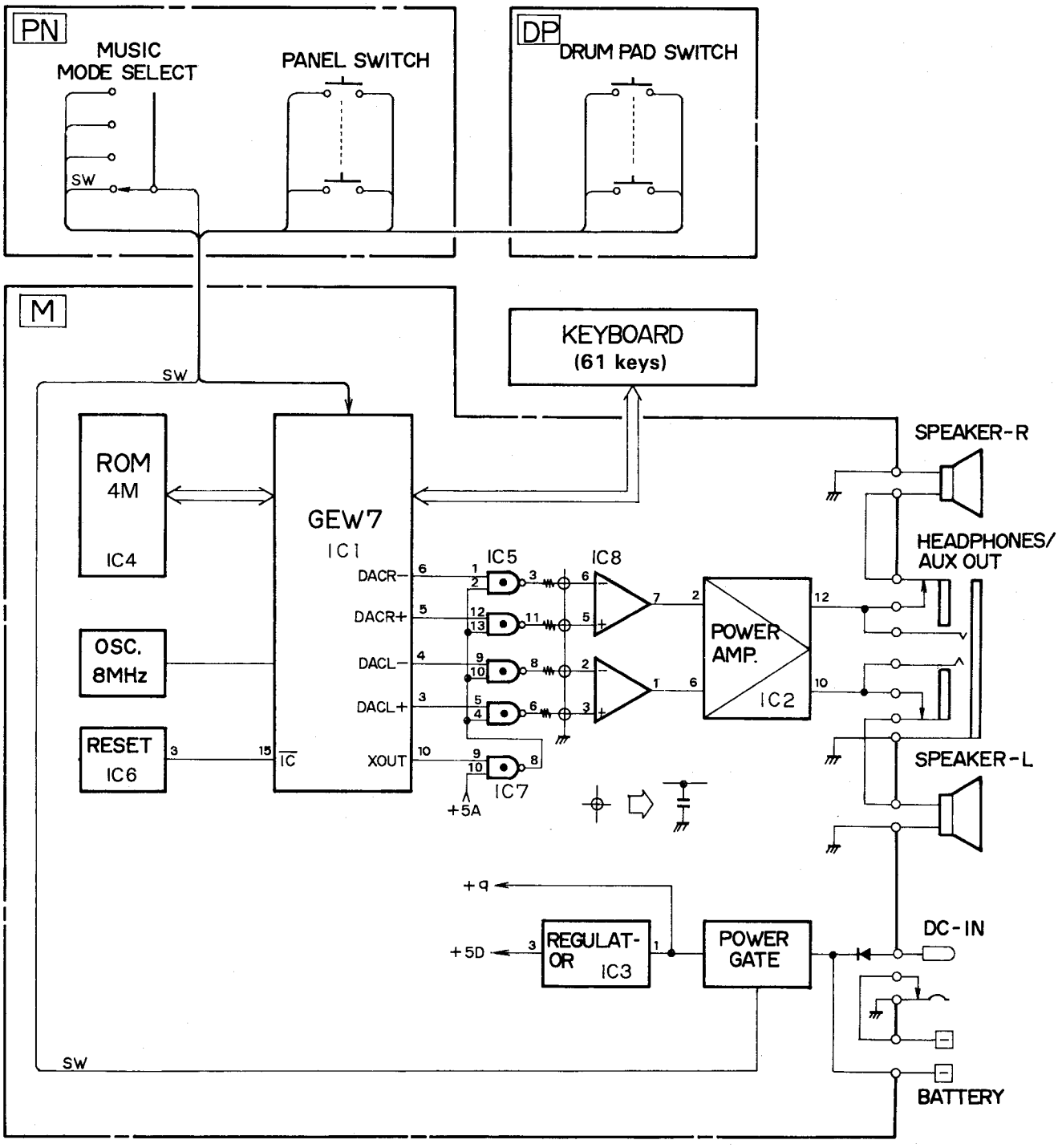
■ BLOCK DIAGRAM



■ DISASSEMBLY PROCEDURE

1. Lower Case Assembly Removal

1-1. Remove the nineteen (19) screws marked (60) and three (3) screws marked (70) and two (2) screws marked (80), then the lower case assembly can be removed. (Fig. 1)

2. Keyboard Assembly Removal

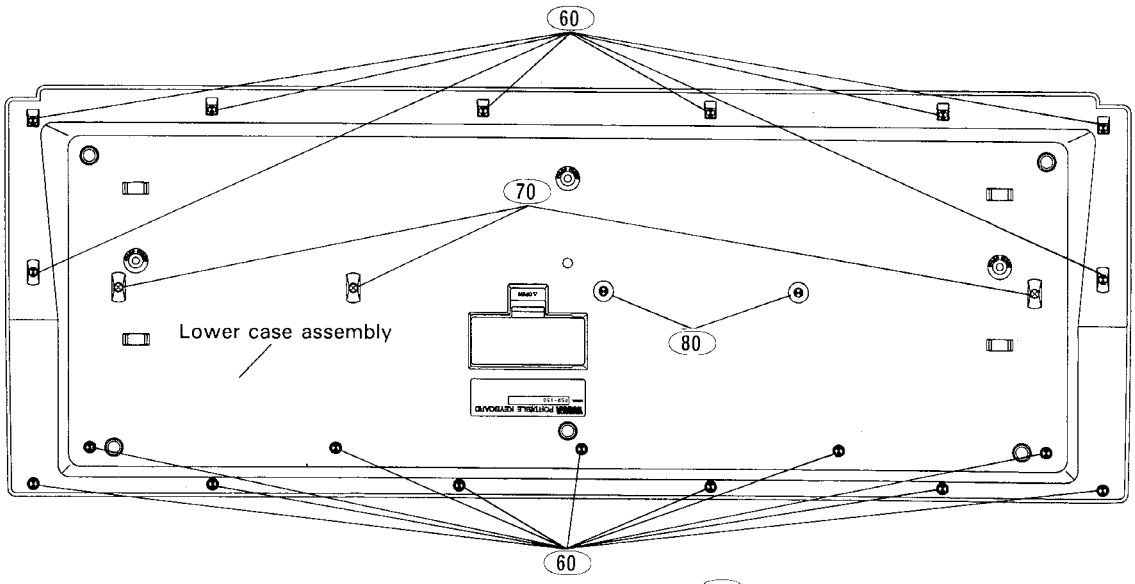
2-1. Remove the lower case assembly. (see procedure 1)

2-2. Remove the keyboard assembly from the upper case. (Fig. 2)

3. M Circuit Board Removal

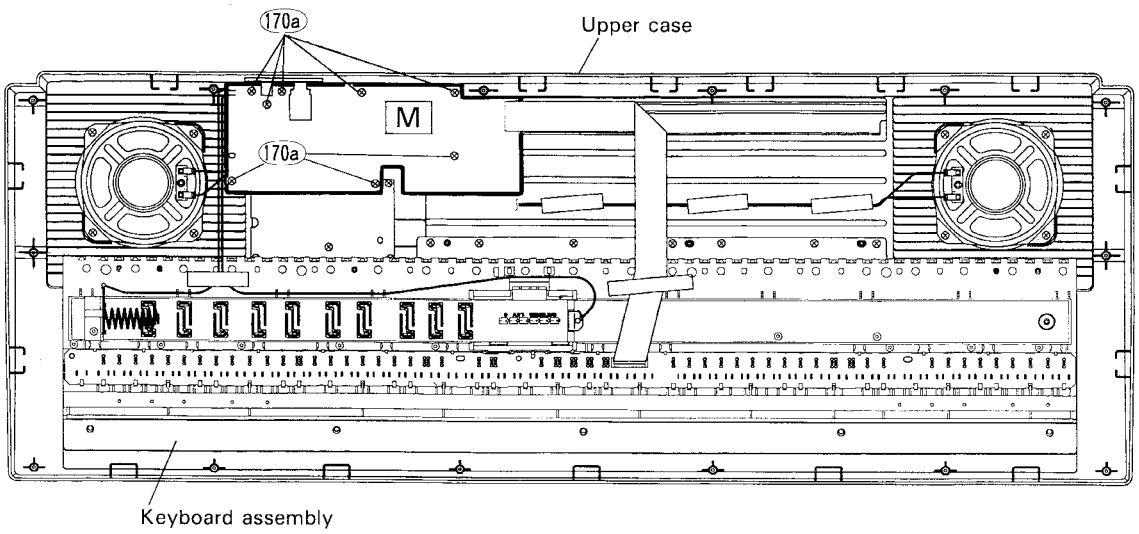
3-1. Remove the lower case assembly. (see procedure 1)

3-2. Remove the eight (8) screws marked (170a), then remove the M circuit board from the upper case. (Fig. 2)



(60) : Bind Head Tapping Screw-P 3.0 × 12 ZMC2BL
(70) : Bind Head Tapping Screw-P 3.0 × 25 ZMC2Y
(80) : Bind Head Tapping Screw-B 3.0 × 20 ZMC2BL

(Fig. 1)



(170a) : Bind Head Tapping Screw-P 3.0 × 8 ZMC2Y

(Fig. 2)

4. PN Circuit Board Removal

4-1. Remove the lower case assembly. (see procedure 1)

4-2. Remove the keyboard assembly. (see procedure 3)

4-3. Remove the six (6) screws marked (170b) , then remove the PN circuit board from the upper case. (Fig. 3)

5. DP Circuit Board Removal

5-1. Remove the lower case assembly. (see procedure 1)

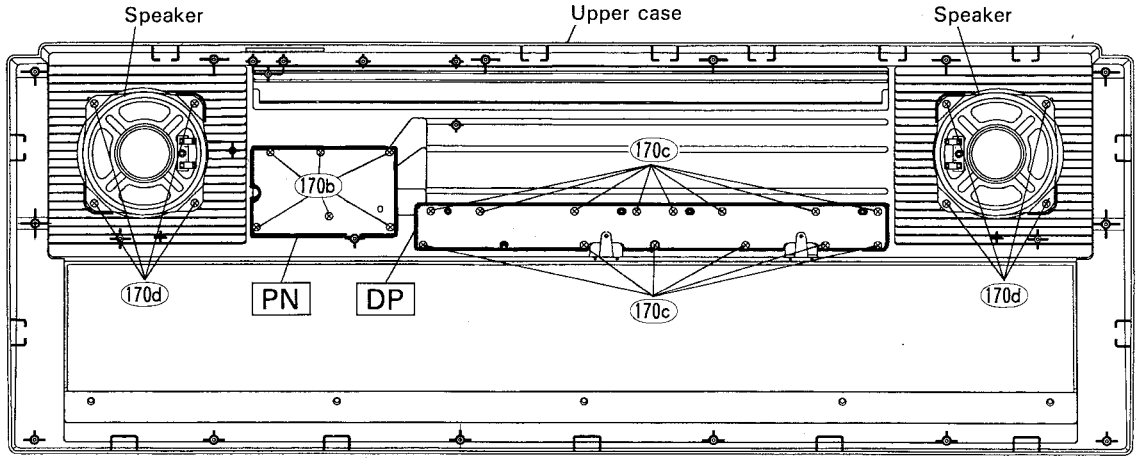
5-2. Remove the keyboard assembly. (see procedure 3)

5-3. Remove the fourteen (14) screws marked (170c) , then remove the DP circuit board from the upper case. (Fig. 3)

6. Speakers Removal

6-1. Remove the lower case assembly. (see procedure 1)

6-2. Remove the eight (8) screws marked (170d) , then the right and left speakers can be removed. (Fig. 3)



(Fig. 3)

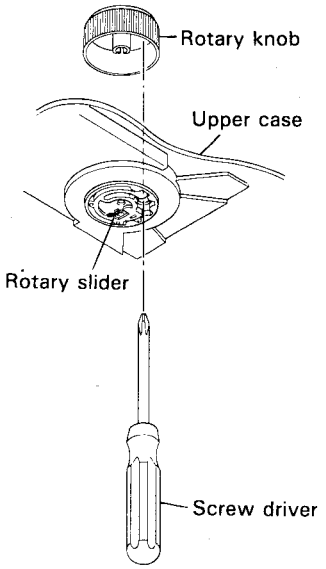
(170) : Bind Head Tapping Screw-P 3.0 × 8 ZMC2Y

7. Rotary Knob Removal

7-1. Remove the lower case assembly. (see procedure 1)

7-2. Remove the PN circuit board. (see procedure 4)

7-3. Push the rotary knob up with a screw driver as shown in the illustration. (Fig. 4)



(Fig. 4)

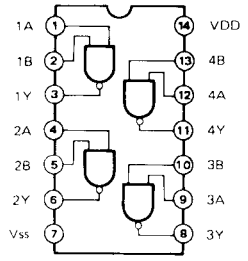
■ LSI PIN DESCRIPTION

• **YMW270-F** (XK328A00) GEW7 (AWM Tone Generator and DAC)

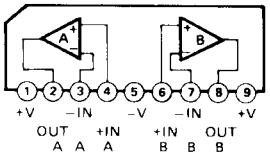
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss		Ground	41	AB0	O	Address bus (ROM)
2	DACVSS		Ground (DAC)	42	DB7	I	Data bus (ROM)
3	DACL+	O	L channel output from DAC	43	AB1	O	
4	DACL−	O	L channel output from DAC (inverted signal)	44	AB2	O	
5	DACR+	O	R channel output from DAC	45	AB10	O	
6	DACR−	O	R channel output from DAC (inverted signal)	46	AB3	O	
7	DACVDD		Power supply +5V (DAC)	47	AB4	O	
8	VDD		Power supply +5V (clock)	48	Vss		(Power supply +5V)
9	XIN		Clock	49	AB11	O	
10	XOUT			50	AB5	O	
11	XVSS		Ground (clock)	51	AB9	O	
12	Vss		Ground	52	AB6	O	
13	LATCLK	O	External latch signal (DAC)	53	AB8	O	Address bus (CPU)
14	$\overline{\text{TEST}}$	I	Test pin	54	AB7	O	
15	$\overline{\text{IC}}$	I	Initial clear	55	AB13	O	
16	MODE0	I	Mode select (with a pull-up resistor)	56	AB12	O	
17	A0	I/O		57	AB14	O	
18	A1	I/O		58	AB15	O	
19	A2	I/O		59	AB17	O	
20	A3	I/O		60	AB16	O	
21	A4	I/O	Port A (CPU)	61	Vss		(Ground)
22	A5	I/O		62	AB18	O	
23	A6	I/O		63	F7	I/O	
24	A7	I/O		64	F6	I/O	
25	B0	I/O		65	F5	I/O	
26	B1	I/O		66	F4	I/O	
27	B2	I/O		67	F3	I/O	Port F (CPU)
28	B3	I/O		68	F2	I/O	
29	B4	I/O	Port B (CPU)	69	F1	I/O	
30	B5	I/O		70	F0	I/O	
31	B6	I/O		71	C7 (RDY)	I/O	
32	VDD		(Power supply)	72	VDD		(Power supply +5V)
33	B7	I/O		73	C6 (R/W)	I/O	
34	DB3	I		74	C5/SYNC	I/O	
35	DB2	I		75	C4/WR (S0)	I/O	Port C (CPU)
36	DB4	I		76	C3/RD	I/O	
37	DB1	I	Data bus (ROM)	77	C2/CK	I/O	
38	DB5	I		78	C1/NMI	I/O	
39	DB0	I		79	C0/IRQ	I/O	
40	DB6	I		80	MODE1	I	Mode select (with a pull-up resistor)

■ IC BLOCK DIAGRAM

• **TC74HC00AP** (IR000000)
Quad 2 Input NAND



• **μPC4570C** (XC520A00)
Dual Operational Amplifier



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■ TEST PROGRAM

1. HOW TO ENTER THE TEST PROGRAM

While pressing the lowest two (2) keys of the keyboard, turn on the power switch of the PSR-150. The PSR-150 will run the RAM TEST routine (refer to the RAM TEST section for details).
Before entering the test, the volume control must be set at comfortable listening level for the test.

2. RAM TEST

When the test program is initiated, a read/write check for the RAM stuck and work areas of the CPU (IC1) will be performed. When the test checks OK, then the program proceeds to the next test automatically. If the test is NG (No Good), a sine wave of C3 will sound to indicate an error occurs.
When the test is performed, the RAM data is initialized.

3. ROM TEST

When the test is initiated, a read test on the ROM for the following addresses will be performed.

IC 4 = 00000h – 7FFFFh

When the test checks OK, then the program proceeds to the next test automatically. If the test is NG, a sine wave of G3 will sound to indicate an error occurs.

4. MODEL ID. TEST

Check that a click signal sounds five times. If the click sounds less than five times, the model identification of the PSR-150 is not properly set.

5. MUSIC MODE SELECT TEST

Operate the MUSIC MODE SELECTOR, and check that a sine wave sounds at each position as follows.
Setting at : [STYLE] will sound C3 note.
[VOICE] will sound C#3 note.
[SONG] will sound D3 note.

6. PANEL SWITCH TEST

Check that a sine wave sounds as shown below when a panel switch is pressed.

SWITCH	NOTE	SWITCH	NOTE
Numeric key 0	D#3	VOLUME▼	G4
Numeric key 1	E3	VOLUME▲	G#4
Numeric key 2	F3	SOUND EFFECT 1	A4
Numeric key 3	F#3	SOUND EFFECT 2	A#4
Numeric key +	G3	SOUND EFFECT 3	B4
Numeric key 4	G#3	SOUND EFFECT 4	C5
Numeric key 5	A3	SOUND EFFECT ◀	C#5
Numeric key 6	A#3	SOUND EFFECT ▶	D5
Numeric key –	B3	DRUM PAD 1	D#5
Numeric key 7	C4	DRUM PAD 2	E5
Numeric key 8	C#4	DRUM PAD 3	F5
Numeric key 9	D4	DRUM PAD 4	F#5
DEMO	D#4	DRUM PAD ◀	G5
START/STOP	E4	DRUM PAD ▶	G#5
TEMPO ▼	F4		
TEMPO ▲	F#4		

7. KEYBOARD SWITCH TEST

Play a scale on the keyboard from C1 to C6. Check that a E.ORGAN of the corresponding note will sound.

8. EXIT TEST PROGRAM

To exit the test program mode, turn the power switch off.

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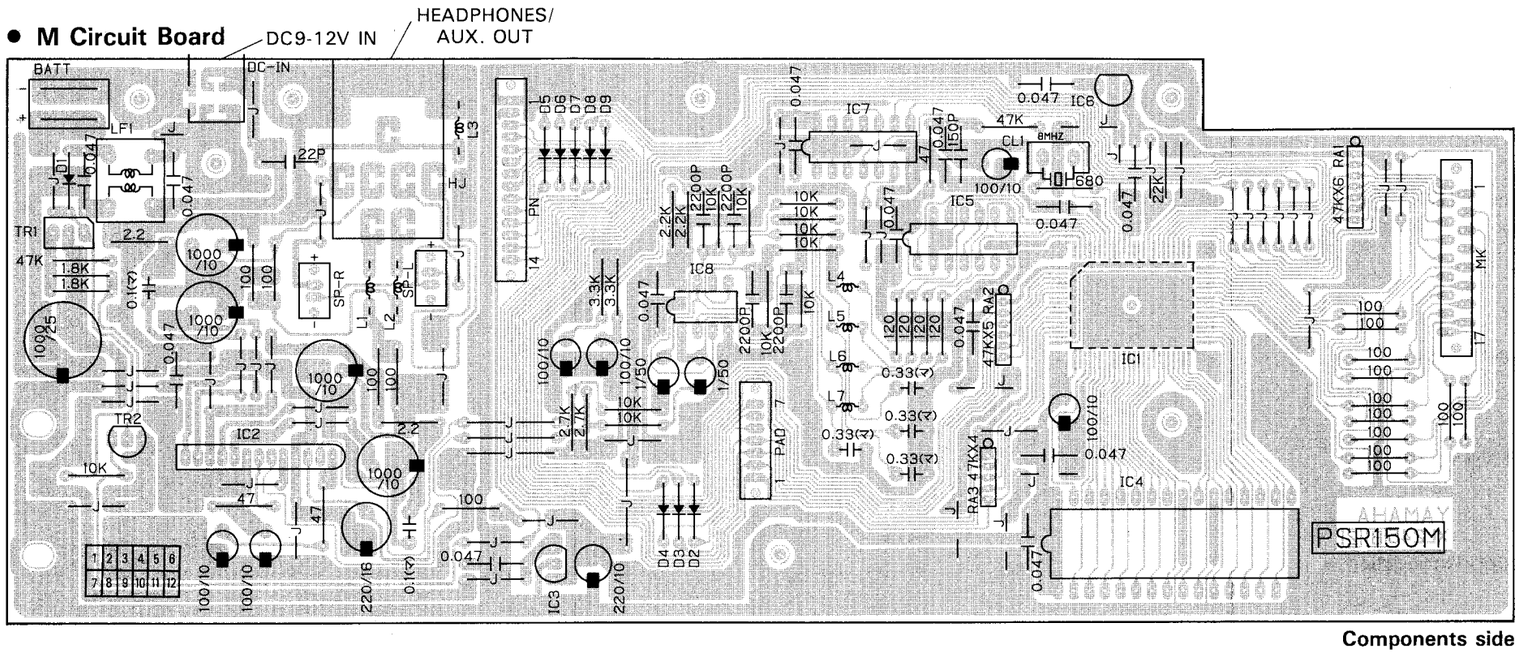
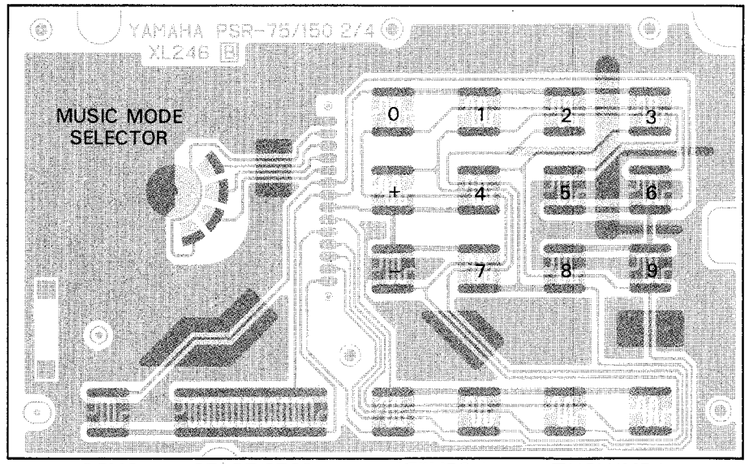
■ CIRCUIT BOARDS

● M Circuit Board



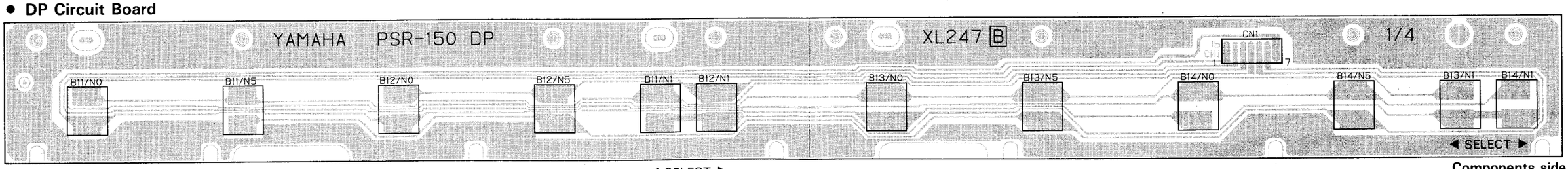
Components side

● PN Circuit Board



Pattern side

● DP Circuit Board



Components side

M : 2NA-VN82110 ⚠1
PN : 2NA-VN82230
DP : 2NA-VN82250

Notes)

Circuit Board: M (VN716900) XL245B0 (J,B,X)
M (VN716800) XL24520 (U,D)

1. IC
   - IC 1: YMW270-F (XK328A00) GEW7
   - IC 2: LA4597 4.6W 2CH (XL279A00) POWER AMP
   - IC 3: AN78L05 (XL554A00) REGULATOR +5V
   - IC 4: (XL561A00) ROM 4M
   - IC 5,7: TC74HC00AP (IR000000) NAND
   - IC 6: PST-572D (XL273A00) RESET
   - IC 8: UPC4570C (XC520A00) OP AMP
2. Transistor
   - TR 1: 2SB1416(TA) Q,R (VH481100)
3. Digital Transistor
   - TR 2: UN4211-(TA) (VH800800)
4. Diode
   - D 1: 11ES4 (VB481900)
   - D 2~9: 1SS133,1SS176 (VB941200)
5. Resistor Array
   - RA 1: EXB-Z07E 47KX6 (VG733600)
   - RA 2: EXB-Z06E 47KX5 (VG733500)
   - RA 3: EXB-Z05E 47KX4 (VG733400)
6. Mylar Cap.
   - 0.1(マ): 0.1000 50V J (UA655100)
   - 0.33(マ): 0.33 50V J
7. Ceramic Capacitor
   - 22P 50V J
   - 2200P 16V N (VD843000)
   - 150P 50V K (VG278200)
   - 47000P 50V Z (VK392400)
8. Electrolytic Cap.
   - 100.00 10.0V (UJ828100)
   - 220.00 10.0V (UJ828220)
   - 220.00 16.0V (UJ838220)
   - 1.00 50.0V (UJ866100)
   - 1000 25.0V (UJ749100)
   - 1000 10.0V (UJ829100)
12. Line Filter
    - LF: UF1717V-200Y1R0 (VL346200)
13. Coil
    - L 1~3: FL5R200QNT 20μ (VB835000) U,D
      LHL06TB332 3.3m (VN657100)
17. Quartz Crystal Unit
    - CR 1: 8.0MHz CST8.00 (VH902200)
14. Phone Jack
    - HJ: YKB21-5006 (LB101870)
15. DC-IN Connector
    - DC-IN: HEC2305 (VC664500)
16. Cable Holder
    - CN 2: 51016 17P TE (to MK)
    - SP: 51048 2P TE (to speaker)
    - PAD: 51048 7P TE (to drum pad)

Notes)

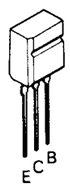
Circuit Board: PN (VN822300) XL246B0

Notes)

Circuit Board: DP (VN822200) XL247B0

1. Push Switch
   EVQ 22C 04K (VP244300)

TR1: 2SB1416



PORTATONE

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PARTS LIST

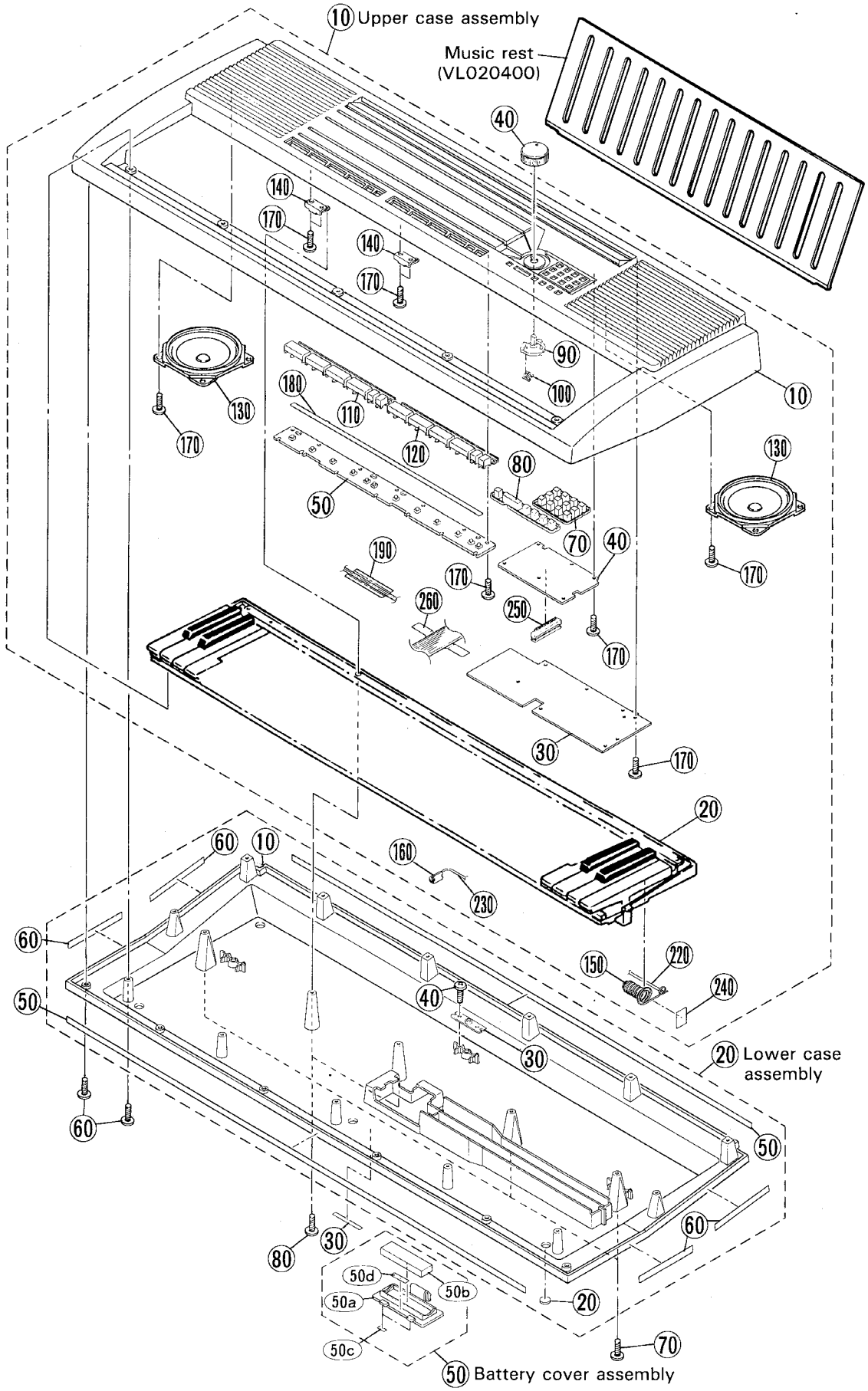
■ CONTENTS

OVERALL ASSEMBLY 1
KEYBOARD ASSEMBLY 3
ELECTRICAL PARTS 4

Note) DESTINATION ABBREVIATIONS

J : Japanese model	A : Australian model
U : U.S. model	E : European model
C : Canadian model	D : German model
X : General model	B : British model
M : South African model	I : Indonesian model
H : North European model	

■ OVERALL ASSEMBLY

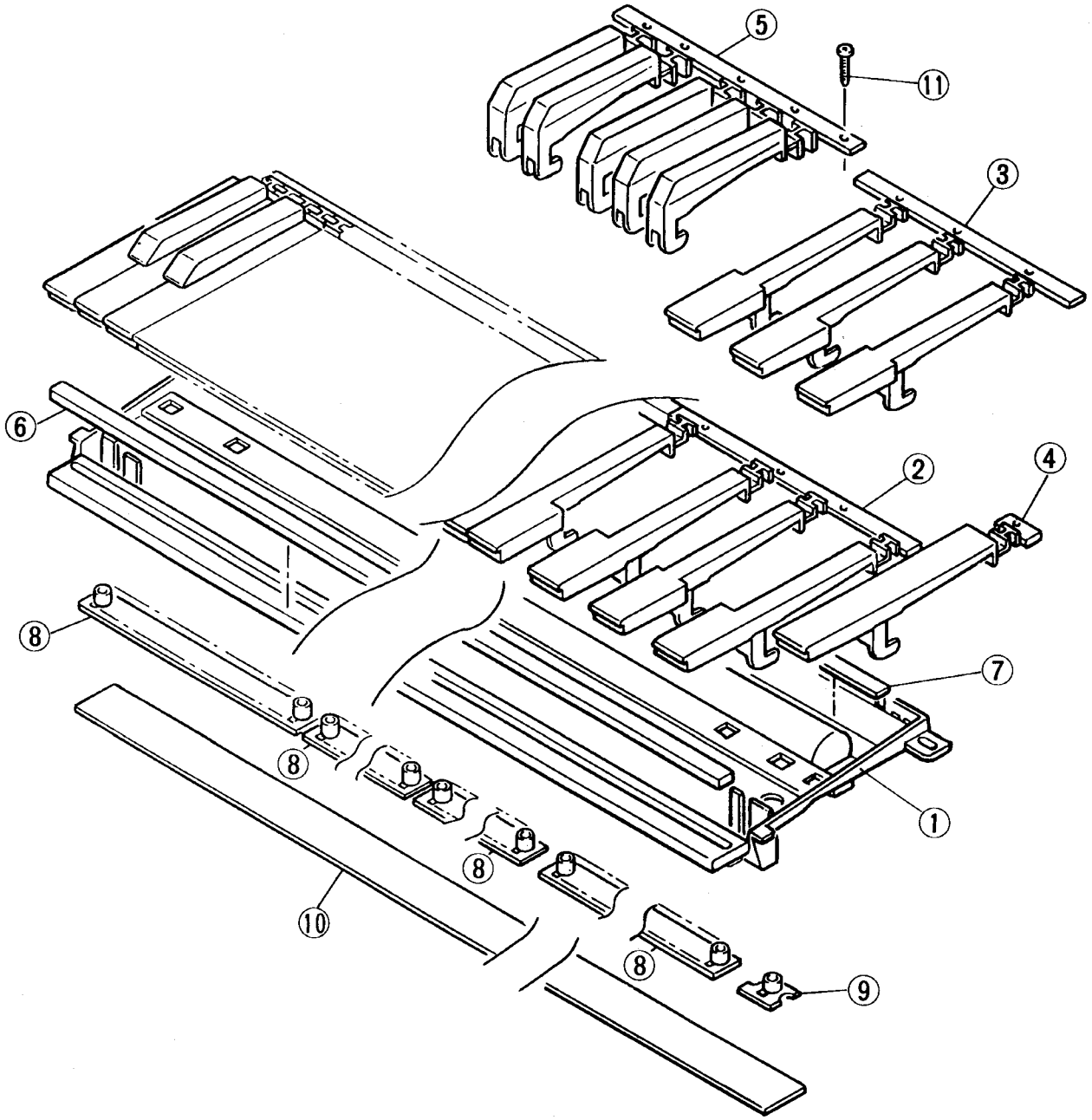


Ref. No.	Part No.	Description		部品名	Remarks	ランク
		<OVERALL ASSEBLY>		<総組立>	PSR150	
10	--	Upper Case Assembly		上ケースAssy	J,B,X (VN74210)	
10	--	Upper Case Assembly		上ケースAssy	U,D (VN74220)	
* 20	VN742300	Lower Case Assembly		下ケースAssy		
30	--	Label		規格，製番ラベル		
40	VN540700	Knob		ローターリーツマミ	MODE SELECT	
50	--	Battery Cover Assembly	BL	バッテリーカバーAssy	(VJ60100)	
50a	CB047850	Battery Cover	BL	バッテリーカバー		02
50b	CB047750	Battery Cushion	GY	バッテリークッション		01
50c	--	Pad	#7100 BL	防振パット	2pcs (CA01485)	
50d	--	Vibration-proof Tape	6X25X0.3	防振テープ	3pcs (VJ56490)	
60	VC161100	Bind Head Tapping Screw-P	3.0X12 ZMC2BL	+バインドPタイト	19pcs	01
* 70	VK228100	Bind Head Tapping Screw-P	3.0X25 ZMC2Y	+バインドPタイト	3pcs	01
80	VJ999700	Bind Head Tapping Screw-B	3.0X20 ZMC2BL	+バインドBタイト	2pcs	01
		<ACCESSORIES>		<付属品>		
	VL020400	Music Rest		譜面立て L		07
	--	AC Adapter	PA-3	ACアダプター	J (VF10400)	
		<UPPER CASE ASSEMBLY>		<上ケースAssy>		
* 10	VN742400	Upper Case Sub-assembly		上ケースサブAssy		
20	VH180700	Keyboard Assembly	C61 K6	16L鍵盤Assy		19
* 30	VN716900	Circuit Board	M	Mシート	J,B,X	
* 30	VN716800	Circuit Board	M	Mシート	U,D	
* 40	VN822300	Circuit Board	PN	PNシート		
* 50	VN822200	Circuit Board	DP	DPシート		
70	VN540300	Rubber Contact	PN-A	PNラバーA		05
80	VN540400	Rubber Contact	PN-B	PNラバーB		05
90	VN540800	Rotary Slider		ローターリースライダー		
100	BB005650	Brush		ブラシ		01
* 110	VN613700	Key Top	x6 GR	キートップ 6連		
* 120	VN742700	Key Top	x6 VI	キートップ 6連		
130	XE657A00	Speaker	10.0cm 4ohm 3W	スピーカ	2pcs	05
* 140	VN613800	Angle Bracket, MK		MK金具	2pcs	
150	VN218200	Spring Terminal	+	接点バネ		03
160	BB005490	Terminal	-	端子板		01
170	EP600280	Bind Head Tapping Screw-P	3.0X8 ZMC2Y	+バインドPタイト	41pcs	01
* 180	VN742500	Vibration-proof Tape	370X6	防振テープ		
190	--	Filament Tape	12X50	粘着テープ	4pcs (VA12610)	
220	--	Wire, Battery	BL	電池線	(VN76390)	
230	--	Wire, Battery	RE	電池線	(VN76340)	
240	--	Vibration-proof Tape	18X25	防振テープ	(VJ86150)	
250	--	Wire Trap	52147 14P TE	ワイヤートラップ	(VK02580)	
260	--	Filament Tape	12X70	粘着テープ	(VN19540)	
*	VN742300	<LOWER CASE ASSEMBLY>		<下ケースAssy>		
10	--	Lower Case		下ケース成形品	(VN61306)	
20	CB043750	Foot	BL	ゴム足	5pcs	01
30	AA056250	Angle Bracket, Leg		脚取り付け金具	3pcs	01
40	EP600280	Bind Head Tapping Screw-P	3.0X8 ZMC2Y	+バインドPタイト	6pcs	01
50	--	Vibration-proof Tape	850X8	防振テープ	2pcs (VN76360)	
60	--	Vibration-proof Tape	100X8	防振テープ	4pcs (VN76370)	

*New Parts (新規部品)

ランク：Japan only

■ KEYBOARD ASSEMBLY



Ref. No.	Part No.	Description		部品名	Remarks	ランク
	VH180700	<KEYBOARD ASSEMBLY>	C61 K6	<１６Ｌ鍵盤Ass'y>	PSR150	19
1	--	Frame	C61	フレーム	(VG49510)	
2	VH180900	White Key	CEGB	白鍵ＣＥＧＢ	5pcs	03
3	VH181000	White Key	DFA	白鍵ＤＦＡ	5pcs	03
4	VH181100	White Key	C'	白鍵Ｃ'	1pc.	01
5	VH181200	Black Key		黒鍵	5pcs	03
6	VH181300	Felt		フェルト		03
7	VH181400	Rubber Sheet		ゴムシート		01
8	VE975200	Rubber Contact	12keys	接点ゴム	5pcs	03
9	VE975300	Rubber Contact	1key	接点ゴム	1pc.	01
10	VH181900	Circuit Board	MK	ＭＫシート		11
11	VB205200	Bind Head Tapping Screw-P	3.0X16 ZMC2BL	＋バインドＰタイト	21pcs	01

*New Parts (新規部品)

ランク：Japan only

■ ELECTRICAL PARTS

Ref. No.	Part No.	Description		部品名	Remarks	ランク
		<ELECTRICAL PARTS>		<電気部品>	PSR150	
*	VN716900	Circuit Board	M	Mシート	J,B,X	
*	VN716800	Circuit Board	M	Mシート	U,D	
*	VN822300	Circuit Board	PN	PNシート		
*	VN822200	Circuit Board	DP	DPシート		
	VH181900	Circuit Board	MK	MKシート		11
*	VN716900	Circuit Board	M	Mシート	J,B,X	
*	VN716800	Circuit Board	M	Mシート	U,D	
	XC520A00	IC	UPC4570C	IC	OP AMP	01
	XL279A00	IC	LA4597 4.6W 2CH	IC	POWER AMP	03
*	XL554A00	IC	AN78L05	IC	REGULATOR +5V	
	IR000000	IC	TC74HC00AP	IC	NAND	03
*	XL273A00	IC	PST-572D	IC	RESET	02
*	XL561A00	IC		IC	ROM 4M	
	XK328A00	IC	YMW270-F	IC	GEW7	12
	VH481100	Transistor	2SB1416(TA) Q,R	トランジスタ		01
	VH800800	Digital Transistor	UN4211-(TA)	デジタルトランジスタ		01
	VB481900	Diode	11ES4	ダイオード		01
	VB941200	Diode	1SS133,1SS176	ダイオード		01
	VG733400	Resistor Array	EXB-Z05E 47KX4	抵抗アレイ		01
	VG733500	Resistor Array	EXB-Z06E 47KX5	抵抗アレイ		01
	VG733600	Resistor Array	EXB-Z07E 47KX6	抵抗アレイ		01
	UA655100	Mylar Cap.	0.1000 50V J	マイラーコン		01
	--	Mylar Cap.	0.33 50V J	マイラーコン	(VP09660)	
	--	Ceramic Capacitor-SL	22P 50V J	円筒セラ (SL)	(VD84050)	
	VD843000	Ceramic Capacitor-X	2200P 16V M	円筒セラ (X)		01
	VG278200	Ceramic Capacitor-B	150P 50V K	円筒セラ (B)		01
	VK392400	Ceramic Capacitor-F	47000P 50V Z	円筒セラ (F)		01
	UJ828100	Electrolytic Cap.	100.00 10.0V	ケミコン		01
	UJ828220	Electrolytic Cap.	220.00 10.0V	ケミコン		01
	UJ838220	Electrolytic Cap.	220.00 16.0V	ケミコン		01
	UJ866100	Electrolytic Cap.	1.00 50.0V	ケミコン		01
	UJ749100	Electrolytic Cap.	1000 25.0V	ケミコン		02
	UJ829100	Electrolytic Cap.	1000 10.0V	ケミコン		01
	VL346200	Line Filter	UF1717V-200Y1R0	ラインフィルター		03
*	VN657100	Coil	LHL06TB332 3.3m	コイル		
	VB835000	Coil	FL5R200QNT 20u	コイル	U,D	01
	VH902200	Quartz Crystal Unit	8.0MHz CST8.00	水晶振動子		02
	LB101870	Phone Jack	YKB21-5006	ホーンジャック	HP/AUX OUT	03
	VC664500	DC-IN Connector	HEC2305	電源コネクタ	DC IN	01
	--	Cable Holder	51016 17P TE	ケーブルホルダー	(VE85290)	
	--	Cable Holder	51048 2P TE	ケーブルホルダー	(VI87800)	
	--	Cable Holder	51048 7P TE	ケーブルホルダー	(VI87850)	
	VA078900	Jumper Wire	0.55	ジャンパー線		
	--	Flat Cable	MK 17P	MK束線	(VN86550)	
	--	Flat Cable	PN 14P	PN束線	(VN86560)	
	--	Flat Cable	DP 7P	DP束線	(VN86570)	
	--	Wire	SP-L	SPL束線	(VN86700)	
	--	Wire	SP-R	SPR束線	(VN86710)	
*	VN822300	Circuit Board	PN	PNシート		
*	VN822200	Circuit Board	DP	DPシート		
*	VP244300	Push Switch	EVQ 22C 04K	ライトタッチスイッチ		
	VH181900	Circuit Board	MK	MKシート		11
	VB941200	Diode	1SS133,1SS176	ダイオード		01
	VD851400	Diode	HSS104TA	ダイオード		01
	--	Wire Trap	52328 17P TE	ワイヤートラップ	(VG92450)	
	XE657A00	Speaker	10.0cm 4ohm 3W	スピーカ	2pcs	05

*New Parts (新規部品)

ランク : Japan only